

CLAIMS

1. A robotic paint applicator located in an enclosed paint spray booth having a potentially combustible atmosphere, said robotic paint applicator comprising: a housing enclosure containing an explosion proof electric motor and a
5 robot arm mounted on said housing enclosure driven by said explosion proof electric motor having a paint applicator on a distal end thereof, said explosion proof electric motor including a motor housing having a gas inlet and a gas outlet spaced from said gas inlet, and a source of non-combustible gas under pressure connected to said gas inlet of said motor housing, circulating non-combustible gas through said motor
10 housing and said gas outlet into said housing enclosure, pressuring said housing enclosure with non-combustible gas and preventing said potentially combustible atmosphere from entering said housing enclosure.

2. The robotic paint applicator as defined in Claim 1, wherein said robotic paint applicator includes a plurality of housing enclosures each including an explosion
15 proof electric motor having a motor housing including a gas inlet and a gas outlet, said source of combustible gas under pressure located outside said paint booth, and a plurality of conduits, each conduit connected to one of said gas inlets of said motor housings and to said source of non-combustible gas.

3. The robotic paint applicator as defined in Claim 2, wherein each of
20 said plurality of housing enclosures is substantially air-tight and interconnected by a gas line, a valve controlling a line connecting said source of non-combustible gas and said gas inlet of each of said motor housings, and a pressure sensitive control connected to said valve, maintaining a predetermined pressure of non-combustible gas in each of said housing enclosures.

4. A robotic paint applicator located in an enclosed paint spray booth having a potentially combustible atmosphere, said paint applicator comprising: a substantially air-tight housing enclosure containing at least two explosion proof electrical motors, each of said explosion proof electrical motors including an enclosed
5 motor housing having a gas inlet and a gas outlet spaced from said gas inlet, a source of non-combustible gas under pressure located outside said paint spray booth and separate gas conduits connected between said source of non-combustible gas and one of said gas inlets of one of said motor housings creating a positive pressure of non-combustible gas in said motor housings preventing said potentially combustible gas
10 from entering said motor housings and said non-combustible gas exiting said motor housings through said gas outlet into said housing enclosure, thereby creating a positive pressure of non-combustible gas within said housing enclosure preventing said potentially combustible gas from entering said enclosure.

5. A robotic paint applicator located in an enclosed paint booth having a potentially combustible atmosphere, said robotic paint applicator comprising: a first housing enclosure including a first explosion proof electric motor therein, a second housing enclosure mounted on said first housing enclosure containing a second explosion proof electric motor therein, and a robot arm mounted on said second housing enclosure having a paint applicator, said first and second explosion proof electric motors each including an enclosed motor housing, a gas inlet and a gas outlet, a source of non-combustible gas located outside said enclosed paint booth, a first gas line connected to said source of non-combustible gas and separate gas lines connecting said first gas line to each of said gas inlets of said motor housings directing non-combustible gas into said motor housings through said gas inlets of said motor housings, creating a positive pressure of non-combustible gas in said motor housings, preventing entry of said potentially combustible atmosphere and said non-combustible gas received in said first and second enclosures from said gas outlets of said motor housings creating a positive pressure of non-combustible gas in said in said first and second housing enclosures, preventing entry of said potentially combustible atmosphere in said first and second enclosures.

6. The robotic paint applicator as defined in Claim 5, wherein each of said first and second housing enclosures is substantially air-tight and interconnected by a gas conduit, a valve controlling said first line and a pressure sensitive control connected to said valve maintaining a predetermined pressure of non-conductive gas in said housing enclosures.

7. A method of protecting a paint robot having an explosion proof electrical motor from explosion in an enclosed paint booth having a combustible atmosphere, said method comprising:

enclosing said explosion proof electric motor and controls therefor in a
5 substantially air-tight housing enclosure;

providing a substantially air-tight motor housing having a gas inlet and a gas outlet spaced from said inlet;

purging said explosion proof motor housing and said housing enclosure by supplying a non-combustible gas under a first pressure to said gas inlet
10 of said motor housing under sufficient pressure to circulate said non-combustible gas through said motor housing and into said housing enclosure through said gas outlet of said motor housing; and

continuing to supply said non-combustible gas to said gas inlet of said motor housing at a second pressure less than said first pressure, but sufficient to
15 maintain said motor housing and said housing enclosure at a positive pressure of non-combustible gas, thereby preventing entry of said combustible atmosphere into said enclosure and said motor housing.

8. The method of protecting a paint robot as defined in Claim 7, wherein said method includes purging said motor housing and said housing enclosure by
20 supplying a non-combustible gas at a first pressure of about 4 bars.

9. The method of protecting a paint robot as defined in Claim 8, wherein said method includes purging said motor housing and said housing enclosure by supplying a volume of said non-combustible gas to said gas inlet of said motor housing at least about five times a volume of said motor housing and said enclosure.

10. The method of protecting a paint robot as defined in Claim 7, wherein said method includes continuing to supply said non-combustible gas to said gas inlet of said motor housing at said second pressure of at least .8 mbar.

11. A method of protecting a paint robot, wherein said paint robot includes
5 a plurality of relatively movable substantially air-tight robot housing enclosures each having an explosion proof motor therein including a motor housing having a gas inlet and a gas outlet spaced from said gas inlet, said method comprising the following steps:

directing a non-combustible gas under pressure into said gas inlet of
10 each of said motor housings, creating a positive pressure of non-combustible gas within said motor housings; and

directing said non-combustible gas from said motor housings into said robot housing enclosures creating a positive pressure of non-combustible gas within said robot housing enclosures.

12. The method of protecting a paint robot as defined in Claim 11, wherein
15 said method includes purging said motor housings and said robot housing enclosures by directing said non-combustible gas to said gas inlets of each of said motor housings at a pressure of at least about four bars.

13. The method of protecting a paint robot as defined in Claim 11, wherein
20 said robot housing enclosures are interconnected by a gas conduit maintaining said robot housing enclosures at substantially the same pressure of non-combustible gas, said method including controlling said pressure of non-combustible gas by continuously determining said pressure of non-conductive gas and operating a valve to maintain said pressure of non-combustible gas at greater than atmospheric pressure.